

WHAT IS CLAIMED IS:

1                   1.       A medical method for treating a person, the method comprising:  
2                   delivering a positive pressure breath to the person;  
3                   extracting respiratory gases from the person's airway using a vacuum  
4 following the positive pressure breath to create an intrathoracic vacuum to lower pressures in  
5 the heart and to enhance blood flows back to the heart; and  
6                   repeating the steps of delivering positive pressure breaths and extracting  
7 respiratory gases.

1                   2.       A method as in claim 1, wherein the person is suffering from ailments  
2 selected from a group consisting of head trauma associated with elevated intracranial  
3 pressures, low blood pressure, low blood circulation, low blood volume, cardiac arrest and  
4 heart failure.

1                   3.       A method as in claim 1, further comprising regulating the amount of  
2 intrathoracic vacuum using a threshold valve that is in fluid communication with the person's  
3 airway.

1                   4.       A method as in claim 3, wherein the threshold valve is configured to  
2 open when the person's negative intrathoracic pressure reaches about -3 cm H<sub>2</sub>O to about -  
3 20cm H<sub>2</sub>O to permit respiratory gases to flow into the person's airway.

1                   5.       A method as in claim 3, further comprising stopping application of the  
2 vacuum when applying the positive pressure breath using a switching arrangement.

1                   6.       A method as in claim 1, wherein the positive pressure breath is  
2 delivered using source selected from a group consisting of a mechanical ventilator, a hand  
3 held bag valve resuscitator, mouth-to-mouth, or a means to provide intermittent positive  
4 pressure ventilation.

1                   7.       A method as in claim 1, wherein the respiratory gases are extracted  
2 with a constant extraction, varied over time, or a pulsed extraction.

1                   8.       A method as in claim 1, wherein the breath is delivered for a time in  
2 the range for about 250 milliseconds to about 2 seconds.

1                   9.       A method as in claim 1, wherein the breath is delivered at a rate in the  
2 range from about 0.1 liters per seconds to about 5 liters per second.

1                   10.     A method as in claim 1, wherein the vacuum is maintained at a  
2 pressure in the level from about 0 mmHg to about -50 mmHg.

1                   11.     A method as in claim 10, wherein the vacuum is maintained with  
2 negative flow or without flow.

1                   12.     A method as in claim 1, wherein the time the positive pressure breath  
2 is supplied relative to the time in which respiratory gases are extracted is in the range from  
3 about 0.5 to about 0.1.

1                   13.     A method as in claim 1, wherein the respiratory gases are extracted  
2 using equipment selected from a group consisting of a mechanical ventilator, a vacuum with  
3 vacuum regulator, a phrenic nerve stimulator, an extrathoracic vest, a ventilator bag, and an  
4 iron lung cuirass device.

1                   14.     A method as in claim 1, wherein the respiratory gases are lowered to  
2 an intrathoracic pressure of about -5 mmHg to about -10 mmHg and then kept generally  
3 constant until the next positive pressure breath.

1                   15.     A method as in claim 1, wherein the positive breath is slowly delivered  
2 and the respiratory gases are rapidly lowered to an intrathoracic pressure of about -5 mmHg  
3 to about -20 mmHg and then gradually reduced towards about 0 mmHg.

1                   16.     A method as in claim 1, wherein the respiratory gases are slowly  
2 lowered to a pressure of about - 5 mmHg to about -20 mm Hg.

1                   17.     A device for lowering intrathoracic pressures, the device comprising:  
2 a means to interface with the patient's airway;  
3 a means to repeatedly extract respiratory gases from the patient's lungs and  
4 airway to create and periodically maintain a negative intrathoracic pressure;  
5 a means to repeatedly regulate the extraction of respiratory gases within the  
6 patient's lungs and airway; and

7 a means to deliver a positive pressure breath, to periodically provide  
8 inspiration of respiratory gases.

1 18. A device as in claim 17, wherein the means to extract respiratory gases  
2 comprises vacuum source selected from a group consisting of a suction line or venturi device  
3 attached to an oxygen tank

1 19. A device as in claim 17, further comprising a switching mechanism to  
2 stop the extraction of respiratory gases during delivery of a positive pressure breath, wherein  
3 the switching mechanism is selected from a group consisting of mechanical devices,  
4 magnetic devices, and electronic devices.

1 20. A device as in claim 17, wherein the means for extracting respiratory  
2 gases is selected from a group consisting of a mechanical ventilator, a vacuum with vacuum  
3 regulator, a phrenic nerve stimulator, an extrathoracic vest, a ventilator bag, and an iron lung  
4 cuirass device

1 21. A device as in claim 17, wherein the means for regulating comprises a  
2 threshold valve that is in fluid communication with the person's airway.

1 22. A device as in claim 21, wherein the threshold valve is configured to  
2 open when the person's negative intrathoracic pressure reaches about -3 cm H<sub>2</sub>O to about -  
3 20cm H<sub>2</sub>O to permit respiratory gases to flow into the person's airway.

1 23. A device as in claim 17, wherein the means for delivering a positive  
2 pressure breath is selected from a group consisting of a mechanical ventilator, a hand held  
3 bag valve resuscitator, mouth-to-mouth, or a means to provide intermittent positive pressure  
4 ventilation.

1 24. A device for lowering intrathoracic pressures, the device comprising:  
2 a housing having an interface that is adapted to couple the housing to the  
3 person's airway;

4 a vacuum source in fluid communication with the housing for repeatedly  
5 extracting respiratory gases from the person's lungs and airway to create and periodically  
6 maintain a negative intrathoracic pressure;

7 a vacuum regulator to regulate the extraction of respiratory gases from the  
8 patient's lungs and airway; and

- 9 a positive pressure source in fluid communication with the housing for  
10 intermittently supplying positive pressure breaths to the person.